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CONNECTICUT ENVIRONMENT

The Citizens' Bulletin of the Connecticut Department of Environmental Protection

December/1989

A Living Tradition

Ed Sarabia on Indian Spirituality

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Cover Photo by Robert Paier

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Editor's Note

Much of environmental thinking involves very rigorous science. Precisely how much of a particular substance is allowable before there are risks to public health? What steps must be taken to reduce unacceptable levels? Answers are given in parts per billion, even parts per trillion. This requires very specific, detailed, and accurate information about the physical world.

But it is also true that science, by constantly opening up new vistas, by announcing new and revolutionary discoveries, proves time and again that final understanding is a will-o'-the-wisp. Again and again, we are reminded that this mysterious physical world is full of surprises.

Just one little example: In his book, *The Secret House*, David Bodanis tells about a tiny, microscopic creature, so small and utterly unsuspected that it was only discovered in 1965. This mite lives only in mattresses and carpets. It survives passively, benignly, and solely on sub-microspcopic flakes of human skin. In one ounce of mattress dust, there are 42,000 of them. If you have a double bed, you have about 2,000,000 of them. It doesn't matter how good a housekeeper you are.

So, this physical world of ours is by no means a fully understood thing. We are constantly revising our figures, finding out things that we never dreamed of.

It is, of course, critically necessary that environmental thinking be grounded in very rigorous, very exact, hard science. But it must also be something more. Really, environmental thinking, environmental awareness, must also be a matter of the spirit.

To all our readers, a very merry Christmas. R.P.

“Healing, not only for the physical and psychological, but also for the heart, feelings, and soul, is the major part of Indian spirituality.” (Photos by R. Paier.)

The Living Tradition of Indian Spirituality

(Ed Sarabia is the coordinator of Indian Affairs at the DEP. He is also a student and teacher of the American Indian spiritual tradition. Historically, whenever Indians have exposed the treasure of their spirituality to non-Indians, they have had some rather rude awakenings and disappointments. That Ed Sarabia is willing to share some of his tradition is a testimony, not only to his great patience, but to our great good fortune. The following interview was originally aired on the television series Environment.*)*

CE: Is there a living, continuing tradition of Indian spirituality, or does it just exist in museums?

ES: There is a living tradition. The problem that we American Indians faced since the Puritans first came here is that we were not allowed as freely as other groups to practice our spirituality, which non-Indians call religion. It’s always been around. We’ve had to change and adapt to the times with the influx of another culture that literally engulfed us. We had to adapt and change some of our practices to the laws and culture that came from Europe.

CE: But it never died out.

ES: It never has died out. Some of the groups in the Midwest and West maintained their own ceremonies without changing because they went underground. Particularly, when reservations were created for some of the tribes, they were left alone. If anything, people would come to talk with them rather than live among them so they were able to keep their spiritual practices.

CE: So, there still exist medicine men, teachers, and elders. These are not just mythic figures.

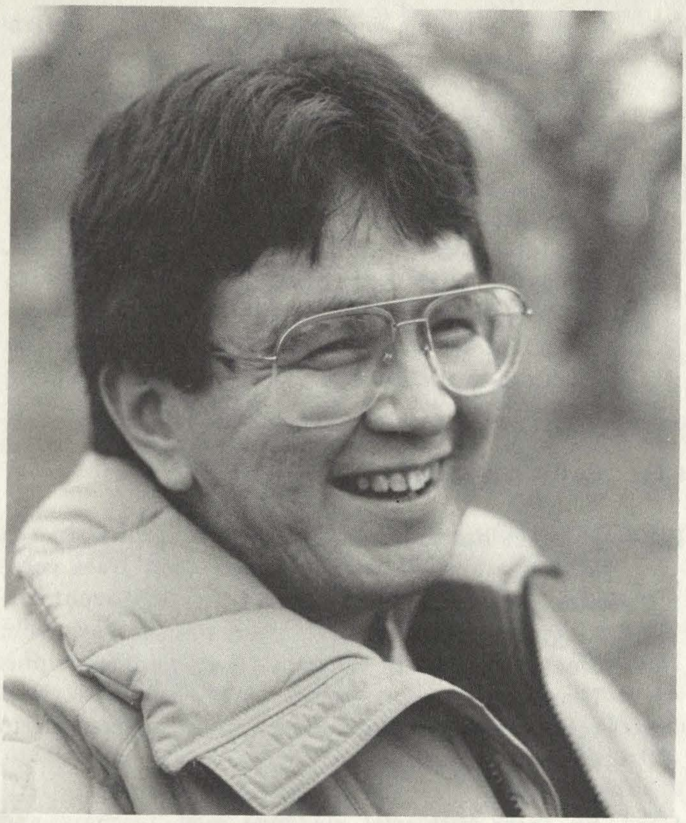
ES: Medicine men, yes. Medicine women, yes. In the Northwest, we call them people with strong medicine, both male and female. In fact, women have run most of the tribes throughout the U.S. A lot of people believe the romantic image of American Indians that men or chiefs ran tribes. Women ran most of the tribes. They were called clan mothers in some tribes, just leaders in others, people with strong medicine in other tribes. So they ran the tribes and sometimes passed on the spirituality.

CE: Then was it the medicine man, or woman, who was the chief of the tribe as well.

ES: Sometimes, but rarely. Usually the medicine man or woman was separate from the chief. Sometimes the chief was also what is considered the sachem. A chief, meaning the head of the tribe, made all of the decisions for the tribe. A sachem could be compared to the secretary of state. He is a politician who faces other tribes and non-Indians. There’s the chief, the sachem, and the medicine men. Sometimes the sachem and the chief are one and the same, usually not. The medicine man rarely holds another position or title.

CE: Is there special training involved in becoming a medicine man?

ES: Yes. Usually it is done through contact with another medicine man or person. A person who has the



"The heart leads us in life. It gives us the ability to take whatever hard knocks come along in the world, whether you're Indian or non-Indian."

training or experience will get to know some of the younger people in the tribe and get a sense of where their heart is -- not so much their *mind* as their *heart*. The heart is not only what leads us in life, but also gives us the ability to take whatever hard knocks come along in the world. Whether you're American Indian or non-Indian, you get hard knocks. What the traditional medicine man looks for is an individual who has that heart and that ability to understand, respect and honor the school of hard knocks.

CE: Isn't it true that Indian spirituality is called medicine because healing is such a great part of it?

ES: Healing is, in fact, the major part of spirituality, because healing is not only for the physical and psychological, but the holistic approach to the heart, feelings, and the soul or spirit. From there, everything emanates from the soul to the body, to the mind, to the feelings. It's a holistic healing. So, yes, medicine man is correct.

CE: You're a teacher of Indian spirituality and tradition, but you are also a student. Can you tell anything about your teachers?

ES: I have been taught by a couple of medicine men from what is called the Wampanoag tribe. I attend ceremonies at the prisons with them regularly. I have also been introduced to the Lakota ceremonies which are much different from the Wampanoag. One of the medicine men with the Lakota is called a *heyoka*. A *heyoka* is basically a medicine man who does things opposite. It's like a comedian who exaggerates life. With a *heyoka*, actions and words are interpreted to mean just the opposite of what they appear to mean. Most *heyokas* have a short life span because it is such a strong personal, spiritual, and emotional drain on them. They are constantly interpreting what the Spirit is saying through them to their tribe and to their people. It really wipes them out. One Lakota was a *heyoka*, but he is no longer a *heyoka* because it just gets too tough. The medicine man here in the Wampanoags has been their medicine man for over 15 years and has been teaching a member of his tribe to be the tribal medicine man after he leaves. He has taught me some -- not all -- of their ceremonies, including their sweats and pipe ceremonies.

CE: Would you explain the physical set-up of the sweat lodge?

ES: The sweat lodge is a circular structure made of branches about six to 12 feet across. Then, towels, blankets, or tarp are laid on it to hold in heat and humidity.

CE: That heat is derived from heated stones.

ES: Correct. What happens is a fire is built and we put rocks in it. Those rocks will be put into a pit in the middle of the sweat lodge. When the rocks are ready, the fire will tell us. The stones will either be white-hot or red-hot. They are taken into the lodge. Then, people go into the lodge and a bucket of water is brought in to the one who runs the ceremony. He pours the water on the rocks to create heat and humidity, which to us is the warmth and tenderness of Mother Earth.

CE: Could you explain some of symbolism that's involved here? Some people are under the misconception that the symbolism is primitive and simple. In fact, it's very complex and sophisticated, isn't it?

ES: Men and women have different processes in their body structure. Women have a built-in gift from our Creator called purification -- which to non-Indians is called the menstrual cycle. That purifies the body and makes it closer to Spirit. The sweat lodge is a way for men to purify their bodies, to be closer to our Creator and, in a sense, to be reborn. The heat and humidity in the sweat lodge in a way is the same as the heat and humidity we experience in our mother's womb before we were born. When we come out of the lodge, the effect is that we are born once again. When we are in the lodge we are in our mother's womb, Mother Earth.

CE: What is it like inside a sweat lodge when it's dark and hot and you confront yourself?

ES: It's absolutely dark. The heat and humidity starts in the first two minutes based upon how much water the leader of the particular ceremony puts on the hot rocks. The experience physically is to begin to sweat almost immediately, both as a result of the hot rocks and the discomfort from the close, absolutely dark quarter. Then, more sweating when hot water is poured on the rocks. What happens, based upon the physical and visual means of the sweat lodge, is that the individual must deal with himself and his Creator. We may feel other bodies next to us, but we really don't know who they are. This makes it a concentration of ourselves on ourselves.

CE: Kind of a healing process.

ES: Correct, correct. Depending upon the individual who runs the particular ceremony. Even tribes vary on how they run a sweat lodge. The Lakota have a drummer and a singer. They run it as long as they feel it's necessary. When they close the door, nothing can be said, as long as the singing and drumming continue. Some people who run it say that if people get very discomforted, they can ask for the door to be opened. Again, it's up to the individual and varies from tribe to tribe. Some people run it like I do, with people praying throughout the different parts of the ceremony. I run it in basically four parts: physical, emotional, mental, and spiritual. I have the door open between those particular aspects so people can have a break, because it does get hot and humid in there.

CE: You have played a part in bringing the sweat lodge ceremonies into prisons in Connecticut. How do the inmates respond to the sweat lodge?

ES: Some of the inmates have become almost fanatical about spiritual services, and get very upset when they miss a sweat lodge ceremony. We do it once a month now, usually on the third Tuesday of the month. We are now expanding to twice a month.

CE: I'm going to ask you about Indian spirituality but in a little different direction. I'm going to ask you about the pain and the heartbreak that characterizes the Indian experience, about the problems of alcoholism and suicide among Indian people. Can you address that?

ES: I'll do what I can. I will say that a lot of it started when the Puritans first came here. They left Europe to escape religious persecution. They came here and persecuted us. They did not allow us to practice our own spirituality and our own religion. It progressed from there. If anything, when the Europeans first came here, they saw the differences between native Americans and themselves. What we saw were similarities. What we noticed is they spent a lot of time praying to their Creator, their God. That is the same as we do.

CE: Different names for the same thing.

ES: Yes. The Europeans had a different word for it, but it was basically the same thing. In fact, that is the reason that a lot of us American Indians became Christians. There was no difference between what they were doing and what we were doing, just a difference of words and where it was done. One of the problems we faced is that non-Indians began to send out missionaries. Their purpose was to force us to become Christian and to abandon our own spiritual practice. The pressure, then, was for us to change. Our culture, religion, and spirituality are one and the same thing for us. You can't live one without the other. As the Europeans pushed west, we were not allowed to practice and it became painful for us. Then we were separated and put on reservations. This separated us from other tribes and from our traditional hunting and fishing grounds. We ended up with a lack of self-esteem. In fact, our spirituality was so taken away that some of us went underground. It was painful to live in a world that in one way separated us and in another way wanted us to be like everyone else. There was a concerted effort to not allow us to speak our language. It is a double-edged sword. We wanted to be with this other society, but at the same time we did not fit in.

CE: And so in that context, drinking became a way out.

ES: The easiest way out was drinking. Drinking became the reason for ignoring our spirituality. So, the basis of our drinking was the loss of our spirituality. Another was the loss of our language. It became very painful for us not to be able to do the practice. In fact, back home some of the medicine men that I knew were very confused as to why our own people would not go to them and talk with them as it was in the past. Part of it was because of so much pressure from the outside. Growing up in school, where we were separated, I remember trying out for Babe Ruth and Little League and being told next year we'll get you -- and all of the American Indians being told the same thing. Even in class, we would make a recommendation to the teacher and be overlooked. At the same time, the person next to us, who was non-Indian, could say virtually the same thing and be called creative. Here we

"Indian spirituality has always been there. We've maintained our identity because this is our country."

were children and school was painful. We knew that the teachers and others did not know us. As a result, we tended to withdraw. Correction. Not tended to -- we did.

CE: Having somehow survived what has been centuries of persecution, hasn't there been a rebirth of Indian identity and Indian traditional spirituality?

ES: It's a type of rebirth. It's always been there. We've maintained our identity because this is our country. This is where we are from. We aren't from Poland. We aren't from France. We aren't from Italy. We are from here. This is our country. The identity has always been here. Identity is based on land for anybody, be it European or non-European, Indian or non-Indian. If I say I am Tlingit, which I am, most other Indians would know that I am from southeast Alaska. You know where you are from. You know your tribe. You know who you are. The identity has always been there. There has been a rebirth in the practice of our spirituality and a claim to our own tribal part of the country.

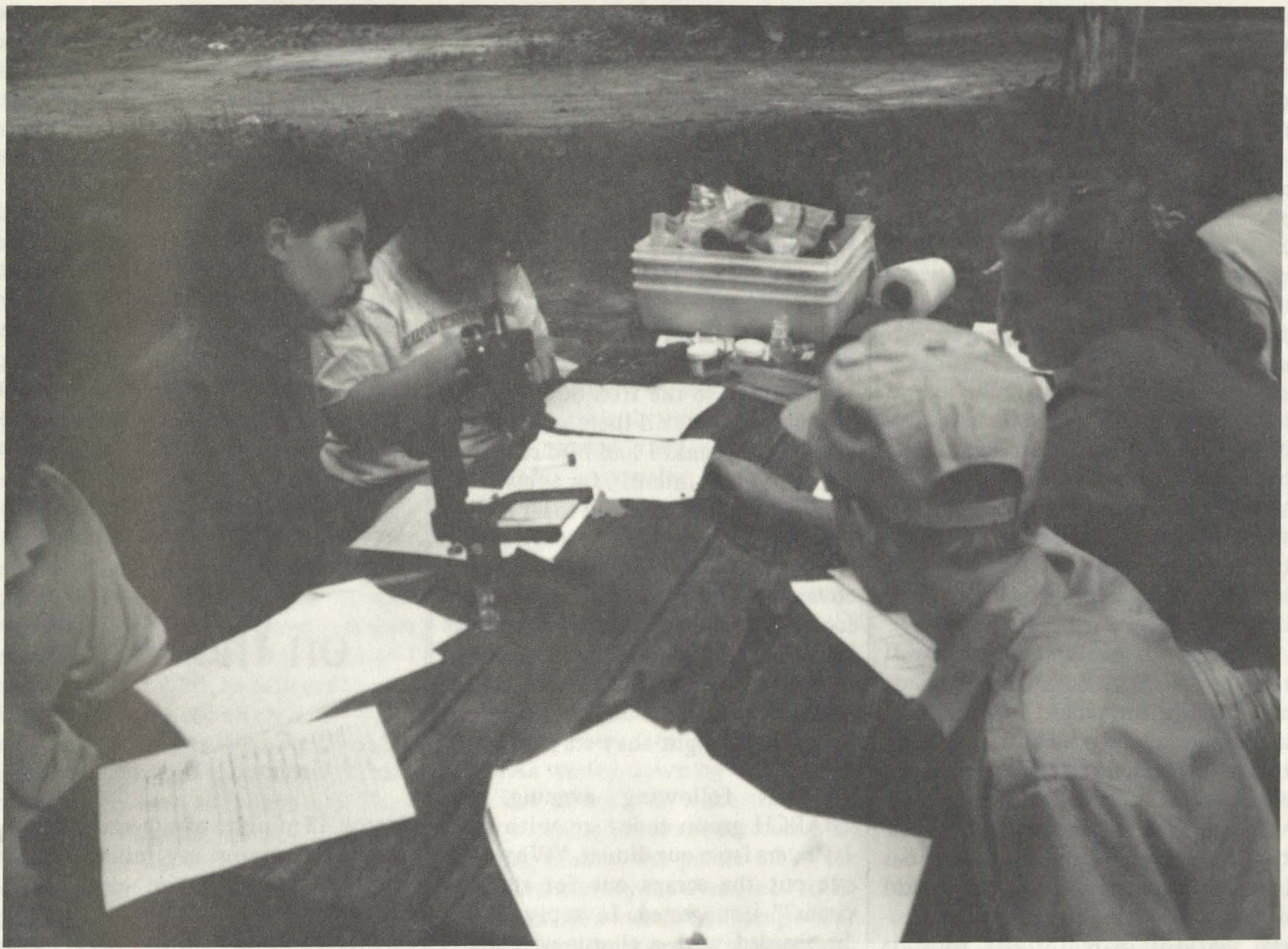
CE: Isn't it interesting in these times of environmental awareness that the non-Indian cultures are reaching to the Indians for direction?

ES: It's been a surprise to me that this has happened. Non-Indian culture is divorced from Mother Nature. If anyone goes to Mother Nature, they are spending $300 dollars to take a trip to Colorado, another $200 for a room at a lodge somewhere, and another $50 for a trip down the river. It's always money. They always know they are going to come back. What they don't do is live and breathe it. Most non-Indians are impacted more by the pocketbook. They are going to say the price of fur has gone up 50 bucks. What they don't know is that the hunting and fishing are life and death for us. If there isn't any fish, some of us are going to die. A lot of non-Indians are separated from that aspect of nature. To them, our environment is not that important and not that close to them.

CE: I want to thank you for sharing things which may have been painful. I hope we can understand that the tragedy of the American Indian is the tragedy of every one of us and our environment, and the hope for the American Indian is the hope for all of us. Thank you so much.

ES: Thank you.

(This article was prepared with the help of Robert Schneiders.) ■



In Project SEARCH, top high school students from Connecticut learn about science, nature, and themselves. (Photo: Darby Orcott)

Notes from the SEARCH Kids

Project SEARCH is a program sponsored by the Education Unit of the DEP. After a rigorous selection process, some of the top high school students in the state are given the opportunity to live and work together in the field. Students learn by doing relevant and meaningful work on a real science project. This year's Project SEARCH, under the direction of Environmental Educator Alberto Mimo, was held at Housatonic Meadows State Park. As the following short articles indicate, the Project SEARCH experience can open young minds to the richness, beauty, and fragility of the environment.

In Search of Self

by

Won Joon Choe
Hall High School
West Hartford

The afternoon was unbearable. We were a debilitated bunch of eight, frantically trying to reach the distant summit amid merciless heat and eternal pestering of those hateful insects that seemed to test the utmost limits of human sanity. It got worse. The terrain was becoming steeper, more jagged, and we were soon wallowing in a pool of sweat. Five-minute rests were becoming almost perfunctory for many of us as we struggled on and on for that elusive peak. It was a living hell.

And then, hooray! There it was. After a long, arduous climb, we had finally set foot on the fabulous refuge of the renowned 1,560-foot peak. The panorama from the top was absolutely amazing. Looking westward, you could see a series of green hills, rolling along the valley below. The cool breeze, the magnificent hawks swooping down for prey, and the vivacious noises of nature blended with my exuberant soul. Up there, far away from the ugly world of man, everything under God's creation seemed to be in harmony with each other — just like the old days when we were more 'attuned' and less 'corrupted.' To me, even the vile mosquitoes and flies no longer seemed like pests, we were all neighbors and brothers on this lovely planet. As I stood alone on the desolate crags, felt myself engulfed by a strange aloneness — no, not the fearful loneliness of longing and emptiness, but a loveliness of being, the quiet exultation of living.

The rest of the time at the mountaintop was spent in our routine activities: the snail collecting, a modest lunch, and short chatters about more worldly subjects. And then the descent. We took a different trail this time, rockier and doubly hazardous terrain. I was really enjoying the day in the wilderness.

When we got back to the van, I realized that my feelings of grandeur and fulfillment would be transitory and in the end, I would have to go back to the superficial world of modern civilization. But even if the experience was short, it was real sweet, one of those rare escapes from the trivialities of everydayness. And who would scorn the man who forsakes this material world in search of self, solitude and a glimpse of the infinite . . . ■

Creatures of the Night

by

Bonnie Ralston

Canton High School

It was a calm, cool July night at Housatonic Meadows State Park. The stars were out in all of their glory and silence cloaked the campsite. Suddenly, a loud crash cut through the air. No sooner had I heard the noise than I came running through the campgrounds, a green, disposable flashlight clutched in my hand, to see if my suspicions were indeed true as to what was causing all the commotion. When I reached our site's garbage cans from where the noise had come, I furiously clicked on my flashlight. Ah-ha! It was just what I had suspected — a raccoon! I was ecstatic with joy as I guided the beam of light from my flashlight up and onto the tree near the cans. There, a pair of beady eyes stared back at me through a black mask. Just then, more rattling attracted my attention. I turned too late to see two more rather plump raccoons running away from the garbage cans, near which I was standing. When they had gone, I turned back to the tree. Sure enough, the raccoon was still there, glued to the side of the trunk. I had him cornered! I watched him intently for a few more minutes and then decided to let him go free.

As I watched the raccoon run for cover into the forest, I thought that I had just witnessed a truly special yet rare occurence of nature. Little did I know, though, that campers everywhere experienced such events practically every night they stayed out-of-doors.

That following evening, my SEARCH group ended up with some leftovers from our dinner. "Why don't we put the scraps out for the raccoons?" I suggested. In reply, I was bombarded with a chorus of "Nos!" I was in mortal shock. How could these people, who claimed they cared for nature and our environment, not want such interesting creatures to visit our campsite? Well, that morning I was converted when I unzipped our tent to find a huge mess, courtesy of the raccoons. Papers, cartons, bags and unwanted food were spread all over the encampment. Yes, and those little rascals gave us the pleasure of picking up after them — every little bit and scrap we could find. And, if it wasn't picking up after the little tycoons, we would then be kept up practically all night, as they noisily raided the garbage cans. But, though every morning I would straggle out of my tent, exhausted beyond belief, I still had faith in the little guys that they weren't all bad, that they weren't just plain bothersome little animals. I feverishly held on to this belief, even going so far at to reserve the last frame on my roll of film for one lucky raccoon who would be immortalized, forever in my photo album. But, by the end of my six-day stay at Housatonic Meadows State Park, I had not yet found "my" raccoon. So, I quickly gave up on raccoons and happily took one more group photo of our SEARCH team.

And, although I did feel a little sad as we pulled away from the site which had been my "home" for the past six days on that crisp, August day, I looked forward to returning home, where I would get a good night's sleep and not be disturbed by the creatures of the night, those mischievous raccoons. ■

Serious Pizzaman on the Trail

by

Caroline Finch

Greenwich High School

It took 45 minutes of wheezing, coughing, and dragging my reluctant body up Bear Mountain, an elevation of 2,354 feet. It seemed like torture, but my body told me it was worse. To even think that the trail I took up Bear Mountain was part of the great Appalachian Trail was too much for me. The mere thought of hiking from Georgia to Maine, up and down mountains, across valleys and ravines, was enough to make me fall back down the mountain (something I didn't want to do).

As I sat upon the rockpile on top of the mountain, I thought, "No one ever seriously hikes the entire trail. It's just too much." Well, I was wrong. After I descended from the rockpile (so I could go in search of snails), a hiker took my place on the rockpile. He was tall and slender, with a backpack half the size of him. The first thing he did when he sat down on the rockpile was pull out his water bottle. As this hiker was drinking and observing the view, another appeared. This man was als slim but shorter. He carried only a small knapsack and was wearing the uniform of a ridge runner. Yes, a profession only die-hard hikers could deal with, and he was one. His trail name was Spanky. When these two hikers met each other it was an entirely different dimension, another world – the world of hikers. Their conversation astounded and bewildered me. Here was Spanky wearing his ridge runner uniform, and the other hiker, evidently totally oblivious to everything around him, asked. "Are you the ridgerunner?" Well, of course he was, and Spanky replied in the affirmitive, then asked, "What's your trail name?" The other said, "Serious Pizzaman". Laughter burst out from Spanky then, with a tone of pity in his voice, he asked, "Why?" Well, it turns out that the Serious Pizzaman works in a pizza factory in Washington, D.C., and after seeing all the ingredients put in the pizza, he doesn't eat it. Then the conversation broke into, "Have you seen so and so?" "Oh, yeah. I'm surprised I passed him." "Well, he believes in taking it slow, so he can enjoy it." "I started in April and I passed so and so also. Have you seen the what's its?" "Yeah, they passed here two days ago. They camped at this site and said they'll be in this other site tonight." "How's the water?" "It's good, but you should kayak on it." "Okay, thanks. Well, I better go. I've done four more miles than I planned and I'd like to stay ahead. I don't want to be stuck in the snow. Bye." "Bye".

That was one of the most absurd conversations I've every heard. Yet, it was really very interesting. Discovering that hikers have their own society on the trial, like nomads. ■

Night Life

by

Keith Brodersen

Edwin O. Smith High School
Storrs

The day is long and hot and life during Project SEARCH is anything but dull; there is just so much to do, learn, and see. The sun moves slowly over our heads as we work, and dies down falling asleep into the night.

As the night progresses, we settle down next to a warm roaring fire. We all tell stories and sing songs as a small feline approaches the fire. We have seen the cat before and it rubs up against our legs hoping to get some food. As we sit with our faces glowing in front of the fire, little do we know that we are being watched. The raccoons are common visitors about this time, they take advantage of our food scraps left throughout the day. We shine our flashlights on them, and their eyes glow mysteriously in the blackened forest. As we watched them night after night, we discovered what curious animals they really are as they sniffed around the camp. Fireflies were also a popular scene. As we looked up at the stars, we could see their flashes of green light. As the night went on, all of us by the sparkling fire would go to bed except for one night when two slept by the fire to observe the night life. After all were in bed we observed the raccoons through the night becoming more curious. They were not afraid to come close. As we lay down by the fire, we also fell asleep and woke up in the early morning to see the raccoons still roaming around the picnic tables for food. Later, everyone awakened to see the night life's toll on our camp – our garbage bags were pulled to pieces and garbage was spread everywhere. We were not surprised; it was like this most of the mornings and it was an expected task for us to clean it all up. The night life had now disappeared and the day life would now begin. ■

Victory Over Paranoia

by

Christine Gaspar

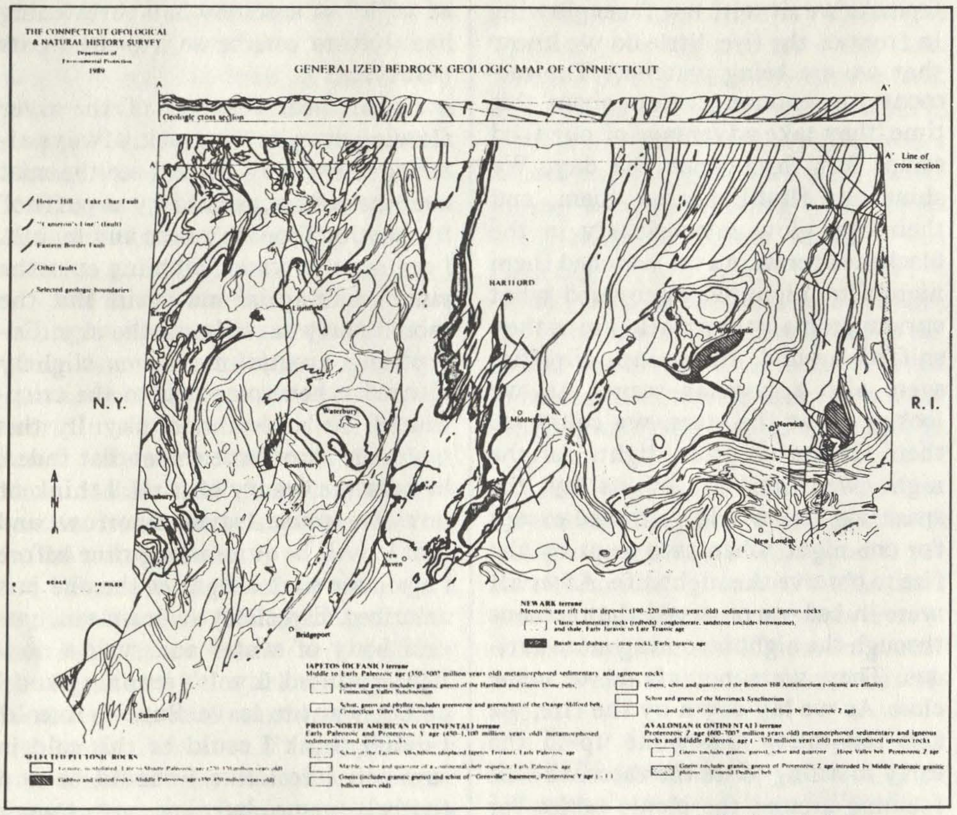
Kennedy High School
Waterbury

2:05 a.m. – I'm too scared to write. I'm thinking of how easily I could die if I was pushed into these cold, fast waters. And I can't stop shivering from the cold. I'm calming down and getting warmer now. It is very peaceful here. The river has a whole new personality at night – a somewhat threatening one. Nature can be so violent in its beauty.

I can hear the roar of the river flowing over its one track, always altering it little by little. I see the mist over the waters, as billowy as puffs of fog coming from my nose and mouth. I can see the water bubbling over the same rocks again and again. But the most beauty must be in the sky. Everything around me seems slightly blurred when compared to the crispness of the mid-summer sky. By this hour, the stars have somewhat faded, but not the beauty of it all. I think of how we must leave tomorrow and that it will be quite a long time before I again see such a sight as the one just described. Especially such a clean, natural body of water and such a non-light-polluted sky. It's stunning and I do not want to leave. But, it's so cold! I didn't think I could be this cold in summer. I feel like I should be at a football game burning my tongue with too-hot chocolate; but I'd much rather be here. I feel as if I could write forever about my feelings for this place. Nature is such a wonder. My time, however, is almost up because I spent the first half of it getting over my paranoia. My fears are so illogical and I'm aware of that, but I still can't come to terms with them. This serenity really should help, but it really doesn't. Every sound makes me jump; my nose, fingers, and toes are frozen; my whole body is full of chills, and my throat hurts, but this whole experience is worth it. It's almost as if it tops off everything we've done here and I know if we didn't do this I'd not feel fulfilled. It's the last act of feeling absolute freedom that we'll experience before we return to the harshness and cruelty of civilization. When we do get there, will it take me another long time to get over a new paranoia? ■

(For further information on Project SEARCH, please write DEP Education Unit, Room 108, 165 Capitol Avenue, Hartford, CT 06106; or phone 566-8108.)

Map of the Month


THE CONNECTICUT GEOLOGICAL
& NATURAL HISTORY SURVEY
Department of
Environmental Protection
1989
GENERALIZED BEDROCK GEOLOGIC MAP OF CONNECTICUT
A
A'
Geologic cross section
Line of cross section
Honey Hill — Lake Char Fault
"Cameron's Line" (fault)
Eastern Border Fault
Other faults
Selected geologic boundaries
N.Y.
R.I.
HARTFORD
Torrington
Litchfield
Kent
Waterbury
Middletown
Southbury
New Haven
Bridgeport
Stamford
Putnam
Willimantic
Norwich
New London
NEWARK terrane
Mesozoic age rift basin deposits (190-220 million years old) sedimentary and igneous rocks
Clastic sedimentary rocks (redbeds): conglomerate, sandstone (includes brownstone), and shale. Early Jurassic to Late Triassic age
Basalt and diabase — (trap rock), Early Jurassic age
IAPETOS (OCEANIC) terrane
Middle to Early Paleozoic age (350-500? million years old) metamorphosed sedimentary and igneous rocks
Schist and gneiss (includes granitic gneiss) of the Hartland and Gneiss Dome belts, Connecticut Valley Synclinorium
Schist, gneiss and phyllite (includes greenstone and greenschist) of the Orange-Milford belt, Connecticut Valley Synclinorium
Gneiss, schist and quartzite of the Bronson Hill Anticlinorium (volcanic arc affinity)
Schist and gneiss of the Merrimack Synclinorium
Gneiss and schist of the Putnam-Nashoba belt (may be Proterozoic Z age)
PROTO-NORTH AMERICAN (CONTINENTAL) terrane
Early Paleozoic and Proterozoic Y age (450-1,100 million years old) metamorphosed sedimentary and igneous rocks
Schist of the Taconic Allochthons (displaced Iapetos Terrane), Early Paleozoic age
Marble, schist and quartzite of a continental shelf sequence, Early Paleozoic age
Gneiss (includes granitic gneiss) and schist of "Grenville" basement, Proterozoic Y age (~1.1 billion years old)
AVALONIAN (CONTINENTAL) terrane
Proterozoic Z age (600-700? million years old) metamorphosed sedimentary and igneous rocks and Middle Paleozoic age (~370 million years old) metamorphosed igneous rocks
Gneiss (includes granitic gneiss), schist and quartzite — Hope Valley belt, Proterozoic Z age
Gneiss (includes granitic gneiss) of Proterozoic Z age intruded by Middle Paleozoic granitic plutons — Esmond-Dedham belt
SELECTED PLUTONIC ROCKS
SCALE
10 MILES
N

The post card version of Connecticut's huge Generalized Bedrock Map measures only five by seven inches. A neat stocking stuffer.

Bedrock Post Card

by
Alan Levere
Senior Environmental Analyst

When I think of geology, I think of things on a grand scale. Mountains, for instance, and eroded landscapes, and canyons. And there is the great geology beneath us, which we only rarely get a chance to view.

Then there are the maps that represent these great entitites. Great maps cover walls, in one- or two-sheet sets, with near-infinite detail. And then there are the geological specimens. It's not at all like collecting leaves or wildflowers. It seems sometimes that geology is a big and heavy undertaking. Until now.

Earlier this year, the Connecticut Geologic and Natural History Survey completed a generalized Bedrock Geologic Map of Connecticut in post card form. Finally, portable geology. These new cards are in full color and measure five by seven inches. The glossy image on the front portrays the five major geologic regions of the state. Thus is tells the generalized story of how the state's bedrock is so diversely situated.

To the west and northwest lie some of the oldest rock in the state. East from there is the Iapetos Region, which was once an ocean between Africa and here, crushed together when the two continents collided. The continents later drifted apart and some of Africa was left right here in Connecticut. That can easily be seen in the east and southeast.

Later, the Iapetos pulled apart and left a valley between the halves. Into the valley went sands, silts, and lava flows,giving this newly filled area an identity all its own.

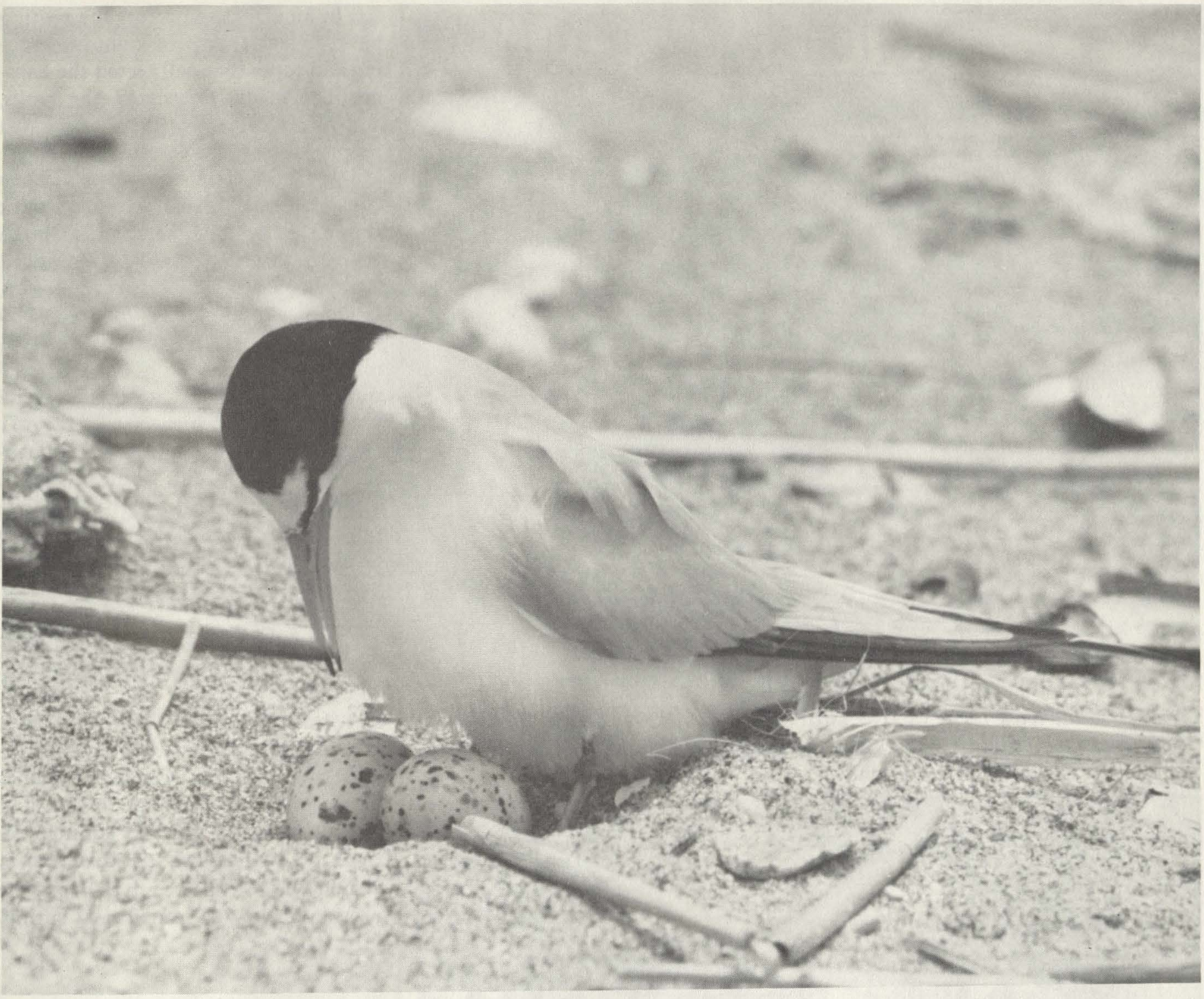
The explanation on the back of the post card leaves plenty of room for addressing and message writing. And it's all here in pocket size form and requiring only $.25 worth of postage. The cards are six for two dollars with no shipping charge. You could actually stuff a stocking with Connecticut's bedrock. Order from: DEP-NRC, 165 Capitol Avenue, Hartford, CT 06106.

Last month we committed two pages to ideas for gift giving. As Christmas draws nearer, we continue that sentiment with the feeling we have saved the best for last -- *Connecticut Environment* magazine. We like to think of it as the perfect gift for all ages.

Connecticut Environment continues to offer feature articles that deal with varied aspects of our state's environment. And the regular columns include the "Editor's Note," which puts each edition into its own perspective; "The Natural Historian," which brings us a bit closer to the world as presented by the Museum of Natural History in Storrs; "The Night Sky" helps us interpret the heavens' constellations; "The Trailside Botanizer" helps familiarize us with a broad range of plants; "Parkview" profiles parks from across our state; the "Bulletin Board" catalogs a wealth of environmentally oriented events, and the "Endnote" gives us something to ponder until the next *Connecticut Environment* arrives. All this for seven dollars per year. It is one of those gifts, as they say, that keeps on giving.

On the back cover of this issue is a subscription form which provides for a gift card with your message on it. We will be happy to send a free copy with all gift subscriptions. We think *Connecticut Environment* is a gift well suited to almost everyone.

So the year is just about done. personally wish everyone the happiest of holidays and true optimism as we close out this decade and head for the next. ■



Adult least tern (Sterna antillarum) *at nest, incubating two eggs. Early June 1989, Cockenoe Island, Westport, Connecticut. First nesting by this species at this location in approximately 10 years.*

The Protected Birds of Cockenoe Island

by
Becca Jo Safran
Photos by
Frank Mantlik

COCKENOE ISLAND (pronounced Co-*key*-nee) is located a mile off the coast of Westport. It was purchased by the town in 1969

Today, 20 years later, the rewards of Westport's foresight in acquiring this island are clearly evident. Not only is the 26-acre barrier island a beautiful spot for picnicking, camping, and sunbathing, it is also a excellent habitat for the least tern and the American oystercatcher, as well as the piping plover, which is listed federally as a threatened species.

This past summer, for the first time in 15 years, colonies of least terns, American oystercatchers, and piping plovers nested on the sand spits of Cockenoe Island. Because their nesting

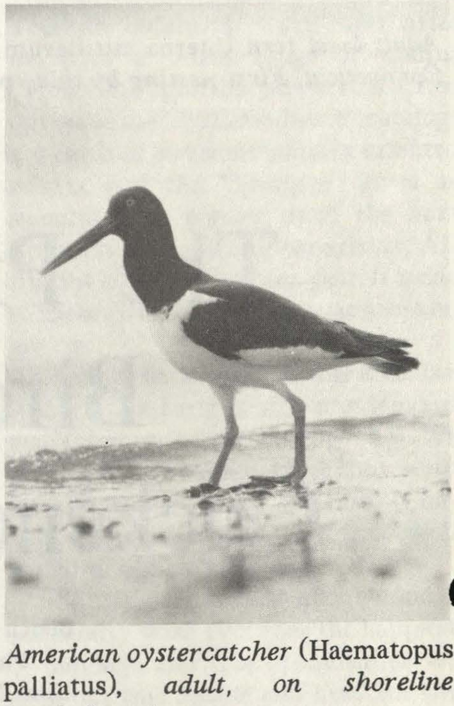
(Above) Adult least terns (Sterna antillarum) *on nesting beach. Early June 1989, Cockenoe Island. (Below) Least tern eggs (two) in nest on sandy beach. Early June 1989, Cockenoe Island.*

sites are the same sandy beaches favored by sunbathers, there are only a few areas in which the birds can have the privacy and isolation they require. The rain contributed to the peace and quiet on Cockenoe Island last spring, when the birds began to nest. However, the western sandy extensions of the island had to be officially closed to public use in early June.

In an effort to protect the nesting birds, signs were placed along the fencing and ropes that delineated the habitat. The media circulated the news, and the local marine police guided people away from the area.

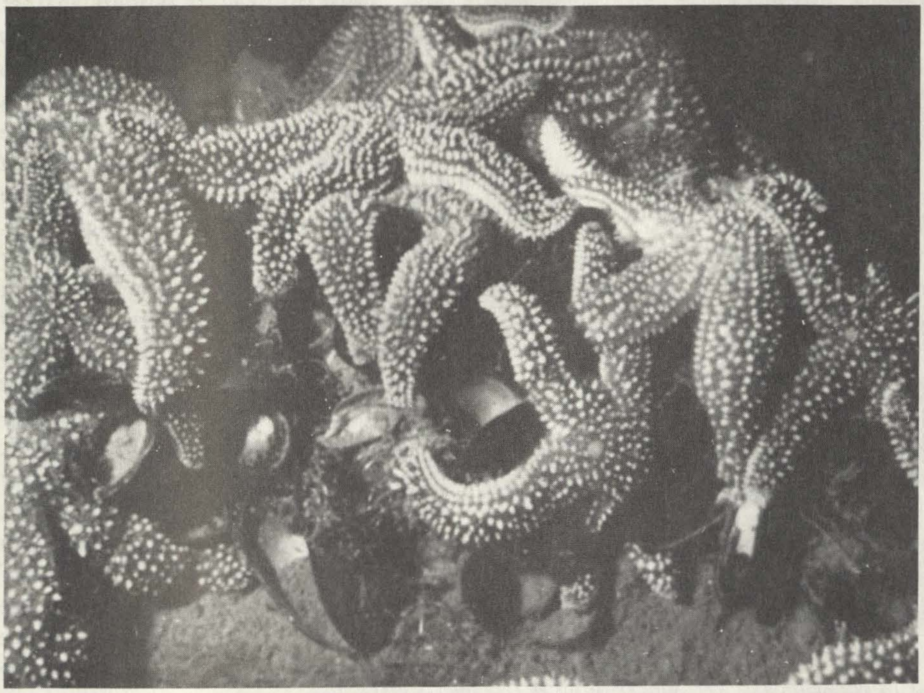
All in all, the nesting was successful. The least terns were the most abundant of the three species. Of the 40 pairs that nested, 20 pairs fledged (fledglings are successful young). A total of 766 pairs produced 280 fledglings. There was one pair of piping plovers nesting on Cockenoe, of which one fledged. Statewide, there were 34 nesting pairs from which 61 fledged. A count of the American oystercatchers has not been finalized. There were two adults sighted occupying one active nest. These statistics are cited from Julie Victoria, a wildlife biologist with the DEP's Bureau of Wildlife.

Surrounding islands that support the habitats of federally protected species are a part of the Stewart B. McKinney Wildlife Refuge. The town of Westport, however, intends to retain ownership of Cockenoe Island. Plans have already been initiated to protect the birds for next summer. In light of the success of this season, which was unexpected, it is hoped the nesting birds will return next spring. ■



American oystercatcher (Haematopus palliatus), *adult, on shoreline beach, foraging.*

The Natural Historian



Starfish (Asterias forbesi) *attacking a bay scallop* (Aequipecten irradians). *Note the bright blue eyes near the edge of the scallop's shell.* (*Photo by Peter Auster.*)

The Underwater Beauties of Long Island Sound

by
Susan Cass
Writing Intern
Connecticut Museum of Natural History
and UCONN English Department

SCUBA DIVERS with their sights on the clear blue waters of the Caribbean might be missing a unique experience closer to home -- Long Island Sound. "After a storm-free period, or when there hasn't been a plankton bloom, Long Island Sound can be very clear, and sometimes you can see 12 or more feet," said Dr. Robert Whitlatch, head of the Marine Sciences Department at The University of Connecticut, located at Avery Point.

"The Sound is dynamic, with water conditions that range from freezing to 60 degrees, attracting a wide range of animal life," said Whitlatch.

The Sound has a natural turbidity that clouds the water into what Peter Auster calls a "rich organic soup." Auster is technical director at the National Undersea Research Center. In the Sound are found the invertebrates (without backbone), some of the most extraordinary and fantastic sea creatures. Invertebrates make up approximately 90 percent of the animal life in the Sound. Creatures such as mussels, lobsters, sea slugs, and sponges, all fall into this category, making them ideal subjects for scientific study, and sometimes excellent food for people.

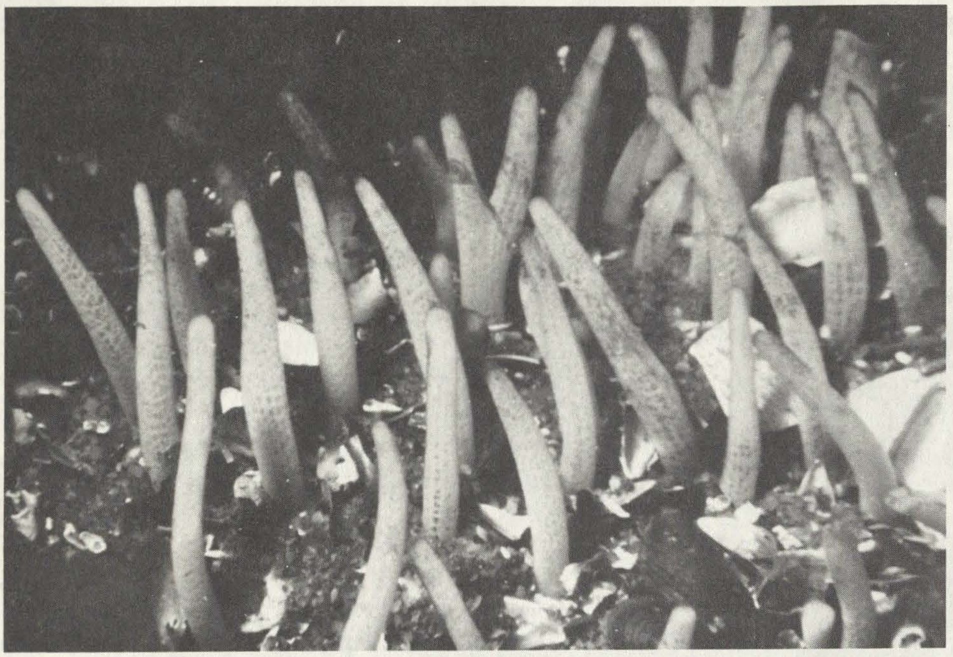
So traveling to another world, while staying close to home, is really not impossible; the invertebrates that live in this briny expanse are like creatures from an alien world.

WHILE MOST INVERTEBRATES are harmless to man, several have harsh methods of defense against fellow invertebrates. Two species of jellyfish, however, should be avoided by humans. First, although only rarely seen in the Sound, is the deadly Portuguese man-of-war; it appears with unusual fluctuations of the Gulf Stream. The second is the lion's mane jellyfish, with its mild sting, "more of a nuisance than a serious danger," according to Robert DeGoursey, educational assistant and diving safety officer at the Marine Sciences Institute at the University of Connecticut, Avery Point. Neither of these two species occur frequently, and need not be cause for concern.

Stalking the bottom of the Sound are some very active predators. "The green crab is an extremely voracious predator, feeding on juvenile shellfish, such as clams and oysters," said DeGoursey. "It has an impact because it's very aggressive and abundant."

The predatory pattern can also be seen in the starfish, a multi-armed bottom dweller. During the winter, most animals reduce their activity and "burrow in." At that time, an unsuspecting blue crab might find itself ambushed by a group of still-active sea stars. These animals have a more advanced system of predation than their filter-feeding jellyfish cousins. This creature is capable of turning its stomach inside out, and digesting the victim externally.

Starfish also feast on the bay scallop. The bright blue eyes of the scallop



These elongate sponges (Polymastia tubulosa) *are all part of a single colonial animal. Sponges feed by filtering small organisms out of water which the sponge circulates through its body. (Photo by Peter Auster.)*

can be seen along its protective shell. These receptors sometimes save the scallop's life. "Once bay scallops recognize a potential predator, they can flap their valves and quickly move out of an area," explained Whitlatch.

Hungry sea stars creep along the ocean floor by use of their arms, which can be regenerated if cut off or lost. These attackers might find their next meal in a collection of mussels and approach and cover them like a quilt.

"All starfish have suckers on their feet. They use their tube feet to force open the shell, which might take them hours, but they only need to open it a little bit," added Whitlatch.

Sometimes, however, the tables turn, and a predator becomes vulnerable to attack from creatures it usually can defeat. "The lobster is a good example," said Whitlatch. "Also, they can sometimes be cannibalistic." The lobster is usually protected by a hard outer coating. However, a few times a year the lobster sheds its armor in order to grow. At this time, it is vulnerable to other predators, such as the sea raven, and to other lobsters.

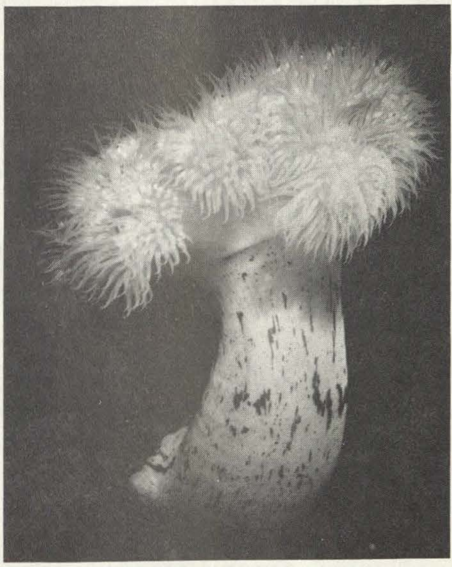
"Much predation is size-related; smaller invertebrates are consumed whenever larger ones can get their mouths over their prey," said Whitlatch.

The sea slug overwhelms its prey in another way. Gracefully feeding on colonies of hydroids, the sea slug takes the defensive stingers right out of its prey, puts the stingers on its own body, and uses them for its own protection.

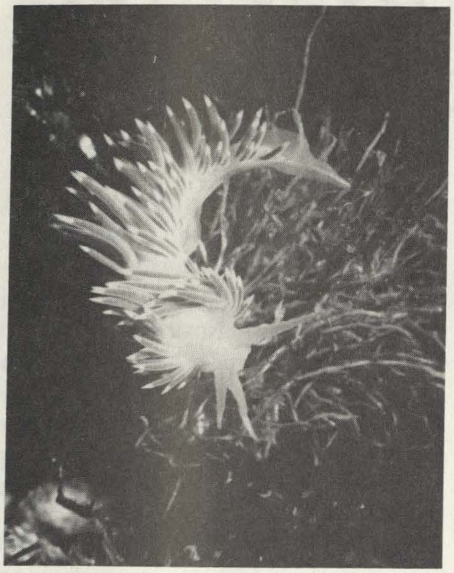
A GOOD EXAMPLE of the use of stinging cells is the star coral, among the most radiant of these organisms. It has a star-like quality; spears of semi-translucent whiteness burst out from the body. However fragile it appears, the star coral is made from a calcium carbonate skeleton. Rays diffuse from a body, called a polyp, that is attached to some surface. These dazzling starbursts project deadly cells that sting and paralyze prey.

Sea anemones could easily be mistaken for a giant mushroom with flower-like caps. This creature should only be admired from afar, for what appear to be soft fluffy fibers are actually stinging tentacles that can capture small fishes and other tiny animals. Even with this capability, the sea anemone usually feeds on plankton and rarely invokes its powers against other animals. The sea anemone stands six to seven inches tall and appears to be cemented in place, but it also can move slowly along the floor of the ocean with the use of its basal disk, a locomotive structure on the underside of the organism.

What seem like hundreds of tiny long-stemmed flowers dwelling in a cluster on a spot of ground are actually colonial hydroids. The soft elegance and dusty whiteness of the hydroids are deadly once they aim their poisonous tentacles at a small traveler. These hydroids live in groups, or colonies, at a certain point in their life. They are composed of a tubular stem ending in a mouth, with a circle of tentacles around it. As is so often the case with underwater beauties, a fierce drive for survival is masked by an attractive innocence.



This fully expanded sea anemone (Metridium senile) *resembles a flower, but is actually a carnivorous animal which catches prey using the long white tentacles. It has the capability of moving slowly along the ocean floor on its basal disk, although most animals remain relatively stationary. It varies in color from white to brick red and is the largest anemone in Long Island Sound, measuring three to four inches at the base and standing six to seven inches high. (Photo by Bob DeGoursey.)*



Sea slugs, or nudibranchs (Coryphella rufibranchialis), *are mollusks without shells. They move about on a muscular foot. This species is feeding on colonial hydroids* (Tubularia). *In the spring it will lay egg masses on the denuded stalks. The long reddish dorsal processes (gills) have stinging cells which are obtained by feeding on hydroids. The cells migrate from the sea slug's digestive tract to the gills where they are used for defense. (Photo by Bob DeGoursey.)*

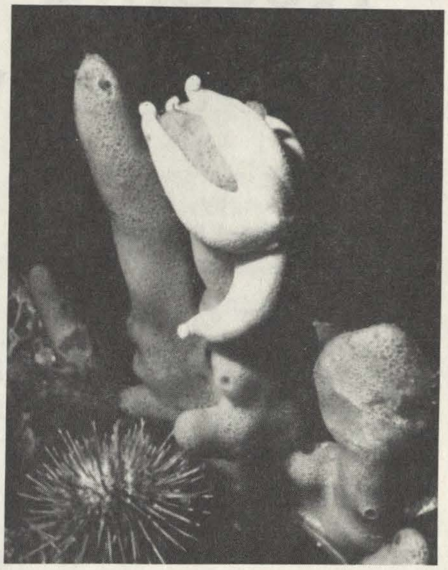
INVERTEBRATES SPEND much of their lives feeding. The simplest way is a process called filter feeding, in which the animal depends on the plankton that floats freely in the water.

A common filter feeder is the sponge, among the oldest group of creatures on this planet. "The filter they have is similar to a sieve," said Whitlatch. "Through changing the mesh size of the fabric of the filter, the animal can let certain things into their mouths." Barnacles, sea squirts, and certain worms dine on plankton. The sea squirt, easily mistaken for a bulb or pod-type plant, takes in water like a vacuum through its opening at the top. Plankton are seized and digested inside the organism, while the unwanted particles are spit back along with the water. Filtering also provides the sea squirt with oxygen. The sessile, or rooted, sea squirt, stays put for its entire life, waiting for food to come to it.

Another species of filter feeder is the blue mussel. Up close, its dark-colored shell can be seen as slightly open, exposing the flesh of the organism as it feeds on plankton. The community of these blue mussels resembles a crowded neighborhood, for they gather in piles, permanently glued to solid ground by a kind of strand or thread. The shells of the mussels are often covered with tiny barnacles and plants, making the cluster even more cozy. The mussels benefit from this close-knit environment, for the shells of the entire group make them safer from the starfish predators. The sponge, rooted in the floor of the Sound, does not complain when the sea star wraps itself around him. This pink creature has found a comfortable resting place in the sponge, and is most likely going about the process of filter feeding. The tiny suckers of starfish enable them to hold their position. The variety of creatures in this area is usually large. A sea urchin with its spiny protective coat may rest nearby, along with several other sponges and a company of colorful plants. These particular sea stars, called bloodstars, may be pale pink or striking red. They are found scattered along the rocks, sweeping up debris and other tiny particles.

IN ADDITION TO THIS SAMPLING of life, there are hundreds of other species of invertebrates in the Sound. The animals you see might depend on the way animals are distributed within the Sound. "The eastern Sound has more oceanic affinities, as compared to the west," said Auster. "The western end of the Sound is more estuarine, with fewer species and higher productivity."

Long Island Sound is home to invertebrates of unusual colors, odd shapes, and various sizes. The territory is no playground; "kill or be killed" is the law. These strange creatures fight and defend, compete and destroy each other, in a world remote from us but, at the same time, right next door.



Bloodstar on sponge feeds on plankton and debris trapped in mucus. Plankton are microscopic plants and animals which are important food for thousands of marine animals. The sea urchin in the foreground is protected by its long spines. (Photo by Peter Auster.)

The Connecticut State Museum of Natural History has "Invertebrate Predators of Long Island Sound" among its migratory exhibits. This and 13 other outstanding exhibits are loaned to schools, libraries, and nature centers for a small monthly fee. The Long Island Sound exhibit features large color photographs of most of the animals mentioned in this article, plus a text and teacher guide with suggested activities for children. For further information, call the Museum at 486-4460.

■

Keeping Connecticut Beautiful
1989 Environmental Legislation

by
Michael Sulivan
Executive Assistant, DEP

(This is the first of a series of articles summarizing some of the significant environmental legislation passed by the Connecticut General Assembly in 1989.)

Section I: Water Quality

P.A. 89-344. An Act Establishing the Long Island Sound Assembly and the Regional Long Island Sound Advisory Councils.

Regional Councils. This act establishes three Long Island Sound Advisory Councils. The first meeting of each council shall be called by August 1, 1989. Each council shall prepare reports prioritizing the concerns for the future of the Sound, recommendations for improving biological integrity and public access, and identification of available resources.

Long Island Sound Assembly. This act establishes the Long Island Sound Assembly, consisting of seven members from each Long Island Sound advisory council, to review the report of each advisory council.

DEP Appropriations. This act appropriates $75,000 to DEP for: 1) activities of the Long Island Sound Assembly and the Regional Long Island Sound Advisory Councils, and 2) the activities of the Bi-State Long Island Sound Marine Resources Committee, and 3) additional staff for DEP to coordinate programs for Long Island Sound.

P.A. 89-377. An Act Amending the Clean Water Program to Comply with Federal Grant Eligibility Requirements and to Amend the Procedures for Issuance of Revenue Bonds for the Program.

This act restructures the Clean Water Program, adds a Long Island Sound Clean Up Account, and revises the procedures for issuance of revenue bonds for the program. This act redefines the major accounts of the Clean Water Program as follows:

1) Water Pollution Control Federal Account; 2) Water Pollution Control State Account; 3) Long Island Sound Clean Up Account.

The Water Pollution Control State Account may be used to pay for costs for administration and management of the Clean Water Fund, as well as for any other purpose of the clean water fund and program.

Long Island Sound Clean Up Account. This $25 million fund will be used for:

1) Grants of 50 percent to municipalities for projects which DEP finds affect Long Island Sound; 2) grants to municipalities for nutrient removal projects; 3) grants to agencies, institutions, or persons to conduct research; and 4) funds for sediment, dredging, and disposal activities; physical improvements to coves, embayments, and coastal wetlands; and harbor water quality programs.

P.A. 89-14. An Act Concerning Requirements for Public Hearings Concerning the Aquisition of Sewerage Systems by Municipal Water Pollution Control Authorities.

This act clarifies the type and amount of notice which a local water pollution control authority must provide before acquiring or constructing a sewerage system. Notice of a public hearing may be mailed not later than 15 days before the hearing to the owner of any property scheduled to be taken. Notice also shall be published at least 10 days before the hearing in a local newspaper.

Section II: Water Resources

P.A. 89-305. An Act Concerning Aquifer Protection Areas, and Local Flood and Erosion Control Boards.

Land Use Controls. By July 1, 1990, DEP shall adopt regulations for land use controls in aquifer protection areas. Such regulations shall establish best management practice standards for regulated activities and proposed to be located within aquifer protection areas. A schedule of compliance of nonconforming activities with such standards also shall be established. DEP shall adopt procedures for exempting regulated activities upon determination that no threat to the public drinking water supply exists. These regulations shall set requirements for design and installation of groundwater monitoring within aquifer protection areas.

Farm Management Plans. DEP shall develop regulations for farm resource management plans by July 1, 1990. Such regulations shall include provisions for the storage and handling of pesticides, and the location of underground storage tanks.

Local Aquifer Protection Agencies. Municipalities shall delineate aquifer protection areas on zoning maps, establish an existing board or commission to act as the aquifer protection agency by ordinance, and adopt regulations for aquifer protection. DEP shall also prepare a model municipal aquifer protection ordinance. The DEP shall adopt regulations establishing standards for the revocation and reinstatement of municipal authority to regulate aquifers.

Local aquifer protection agencies authorized by this act shall, by regulation, provide for: 1) the manner in which the boundaries of aquifer protection areas shall be established, amended or changed; 2) the form for an application to conduct regulated activities within the area; 3) notice and publication requirements; 4) criteria and procedures for the review of applications; and 5) administration and enforcement.

Permit Applications/Filing Fees. No regulated activity shall be conducted within any aquifer protection area without a permit.

Enforcement. An aquifer protection agency may issue an order to cease any activity or correct any facility which violates this act. Any person who violates any provision, ordinance, or regulation shall be assessed a civil penalty of up to $1,000 for each offense. Any person who willfully or knowingly violates any provision shall be fined up to $1,000 per day, imprisoned up to six months, or both. Subsequent violations shall be fined up to $2,000 per day, imprisoned for up to one year, or both.

Other DEP Responsibilities. DEP shall assume overall responsibility for the implementation and monitoring of this act. The department also shall: formulate technical courses for members/staff of municipal aquifer protection agencies; develop a strategic groundwater monitoring plan; inventory agricultural land uses; review municipal aquifer protection regulations for consistency and relevancy; give priority to grants for capital improvements in accordance with a farm resource management plan; and prepare guidelines for the acquisition of lands surrounding existing or proposed public water supply well fields.

Groundwater Programs. DEP shall develop a groundwater education program in conjunction with The University of Connecticut. DEP also shall provide public recognition of users of land located within aquifer protection areas. The program shall promote groundwater protection through education of members of business, industry and the public.

Reports/Studies. DEP and DOT, within available appropriations, shall study methods to prevent the contamination of drinking-water in aquifer protection areas through design, construction and maintainance of transportation routes.

P.A. 89-356 An Act Concerning Local Administrative Appeals and Inland Wetlands Regulations, Boundaries, and Permits.

Notice of Decisions. This act provides that local planning and zoning commissions shall publish notices 15 days after decisions have been rendered in approval/denial of site plans and special permits/special exceptions. This 15-day rule also applies to changes in inland wetlands regulations or boundaries. If notice is not published within the 15-day period, the person who submitted the proposal may provide for the publication of such notice within 10 days.

Time Extensions for Application Review. This act establishes standards for extensions of time periods on inland wetlands applications. The failure of the inland wetlands agency or DEP to act within any time period or extension shall *not* be deemed to constitute approval of such application.

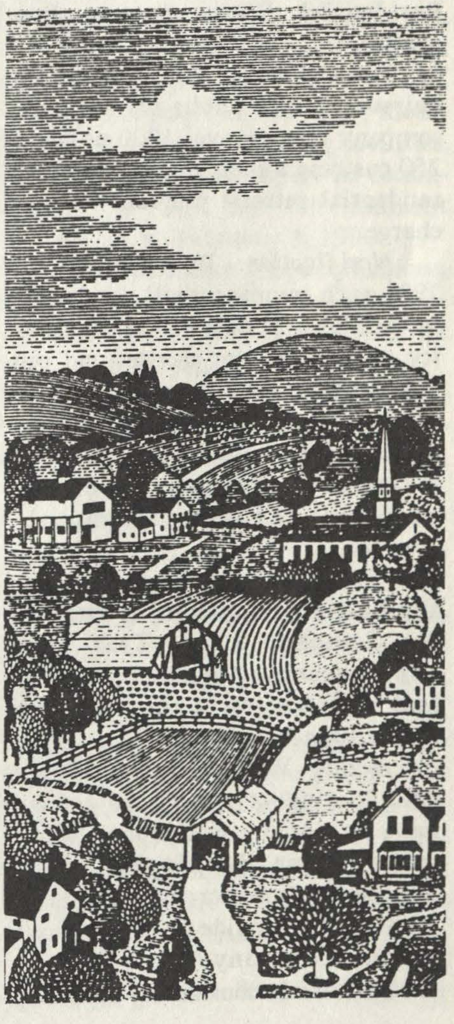
P.A. 89-311. An Act Establishing a State Affordable Housing Land Use Appeals Procedure and Concerning the Effect of Changes in Zoning or Inland Wetlands Regulations on Previously Filed Applications.

Under this act, any change in inlands wetlands regulations or boundaries made after a local inland wetland agency has approved an application shall not affect that application.

P.A. 89-327. An Act Establishing A Water Resources Policy

State Goals. Under this act, the state's water goals and policies are to: protect water supply watershed lands and prevent degradation of surface water and groundwaters; protect groundwater recharge areas; make water resources conservation a priority in all decisions; conserve water resources through technology, methods and procedures designed to promote efficient use of water; prevent contamination of water supply sources or reduction in the availability of future water supplies; balance competing and conflicting needs for water equitably and at a reasonable cost to all citizens; and reduce or eliminate the waste of water through water supply management practices.

Memorandum of Understanding. OPM shall coordinate the activities of DEP, DOHS, and DPUC including: 1) reviewing the authority of each agency for consistency with the state goals and policies; 2) preparing a memorandum of understanding, within six months, to avoid overlap and redundancy between agencies, and; 3) developing recommendations for legislation.



P.A. 89-303. An Act Concerning Minimum Efficiency Standards for Plumbing Fixtures

Standards. The Department of Consumer Protection (DCP,) in consultation with DEP, shall adopt regulations establishing minimum efficiency standards for plumbing fixtures and other water-using devices by October 1, 1990. This act specifies the maximum water use allowed for various plumbing fixtures.

Prohibitions. No person may sell or install any new plumbing fixture that does not meet these standards after the date specified.

Testing/Inspections. DCP shall establish procedures for testing the efficiency of retail plumbing fixtures if such procedures are not established in the state building code.

Penalties. Any person who violates any provision shall be assessed a civil penalty of $250 dollars for each violation.

P.A. 89-266. An Act Establishing A Residential Water Saving Program.

Retrofit Program. This act requires that each public water supply company serving over 1000 people or 250 customers shall make available a residential retrofit program without charge.

Notification. By January 15, 1991, each company shall notify each residential consumer of the availability of water saving devices and provide devices to each consumer upon request.

Penalties. This act allows DOHS to impose a civil penalty for noncompliance ($15 for each violation).

P.A. 89-301. An Act Implementing the Recommendations of the Water Company Lands Task Force and Concerning Water Diversions and Notification of the Storage of Hazardous Materials.

Notice. When an application is filed to conduct a regulated activity upon an inland wetland or watercourse within the properly mapped watershed of a water company, the applicant must provide written notice to the water company.

Permits. In considering permit applications for use of any land in class II, DOHS must consider the incremental effect of development. A permit shall not be granted unless DOHS determines that such proposal will not harm the public drinking water supply.

Sale of Water Company Lands. Any water company selling land that at any time has been in the water company's rate base shall use the net proceeds from the sale for capital projects which improve or protect the water supply source or for acquisition of land to protect a source.

Storage of Hazardous Waste. Under current law, employers must notify water companies of the storage of hazardous wastes in watersheds under certain conditions. This act deletes the termination date for the notification requirements.

Section III: Solid Waste

P.A. 89-130. An Act Establishing Priorities for Solid Waste Management Decisions.

This act requires DEP to consider establishing the following heirarchy for solid waste management decisions:

1) Source reduction;
2) Recycling;
3) Composting of yard waste;
4) Bulky waste recycling;
5) Waste to energy plants;
6) Incineration; and
7) Landfills.

The act also requires DEP to establish specific goals for source reduction as part of the statewide solid waste management plan. This plan shall include goals for bulky waste recycling and composting of yard waste.

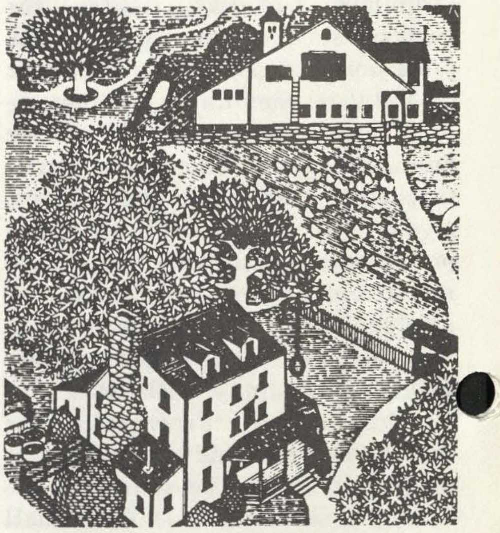
2) P.A. 89-384. An Act Establishing a Process for the Siting of Ash Residue Disposal Areas by the Connecticut Resource Recovery Authority.

Siting Criteria. This bill authorizes CRRA to establish two ash residue disposal sites east of the Connecticut River and two sites west of the river. These sites must be selected from among 13 sites identified by DEP in a January 1989 report on potential disposal sites or found by DEP to meet the report's siting criteria. No site may be within four miles of any ash disposal site operated by CRRA owned or operated on January 1, 1989. No more than one site can be established in any single regional planning area.

DEP may determine that fewer than four CRRA sites are needed if a municipal zoning commission designates an area as suitable for ash residue disposal by October 1, 1989. If no application for a municipally-designated site is filed with DEP by July 1, 1990, or if DEP determines that development of the site is not being pursued in good faith, DEP may revise the determination of need for the four CRRA sites.

Negotiation/Arbitration Process. This act establishes a process for negotiation between the proposed host municipality and CRRA. The negotiation shall include: 1) compensation: 2) reimbursement; 3) screening and fencing of the ash disposal area; 4) operation of the disposal area; 5) traffic flow; 6) site closure costs and site use after closure; 7) payments to the town for road repairs; 8) a greenbelt buffer around the site; 9) purchase of fire fighting equipment; 10) police or fire costs; 11) funding of monitoring program; and 12) compensation for the municipality in which the ash disposal site is located. The total compensation for these items shall *not* be less than $5 per ton of ash deposited.

Without local zoning approval, the site may be constructed or modified only if the Connecticut Siting Council has approved a negotiated



agreement or issued an arbitration award where no agreement has been reached.

Condemnation of Property. This act authorizes CRRA to condemn property for the four ash disposal sites without regard to current statutory limitations involving written consent from the host municipality.

DEP's Role. This act allows DEP to issue a permit regardless of local zoning approval if the Siting Council has approved a negotiated agreement or issued an arbitration award. The DEP must decide on a solid waste permit application for an ash site within a year. If the Siting Council has not approved an agreement or issued an arbitration award, DEP has until 30 days after the award is issued. This act does not limit DEP's authority to impose requirements on sites. DEP requirements supersede any negotiated or arbitrated agreement inconsistent or less stringent than those requirements.

P.A. 89-386. An Act Concerning Solid Waste Management.

This act clarifies numerous statutory provisions concerning solid waste. These provisions include changes in the definitions of solid waste, volume reduction plants, recycling facilities, transfer stations, resource recovery facilities, municipal solid waste, and wood burning facilities.

Certificate of Need. This act establishes a detailed process which DEP shall use to make decisions on permits for resource recovery facilities, ash residue sites, and mixed municipal waste landfills. Under this new procedure, DEP must publish notice of a preliminary determination of the need for a proposed facility or landfill within 60 days of an application for a permit. As outlined below, the type of information required by DEP will depend on whether the facility involved is a resource recovery facility or an ash residue and mixed waste landfill.

a) *Resource Recovery Facilities.* DEP shall not issue a permit unless the applicant can show that the proposed facility, in conjunction with all other facilities and potential expansions, will not exceed the level of capacity cited in the state's solid waste management plan. The applicant must provide information on the design capacity, operating rate, and average daily amount of waste to be processed each year. The applicant must also indicate capabilty to complete projects and the project's technical feasibility.

b) *Ash Residue/Mixed Waste Landfills.* Applicants for preliminary determination of need must provide information on name of towns or resource recovery facilities to be served; transportation systems needed; available capacity of other mixed waste or ash residue sites with permits; and capacity of the proposed area.

Permit Exemptions. This act provides two exemptions from permit requirements for composting and recycling facilities. First, any facility where the sole business or activity is composting of leaves shall be exempt. DEP may adopt regulations concerning the design, operation, monitoring, and reporting of these facilities. Second, DEP may adopt regulations to exempt categories or classes of recycling facilities from these permit requirements. Finally, these provisions shall not exempt composting or recycling facilities from any other applicable environmental statutes or regulations.

Scrap Metal Dealers. Under this act, a scrap metal processor shall not be required to obtain a permit as long as he submits an annual report to DEP, beginning July 1, 1990.

Ash Residue Plans. Under this act, the owner of each incinerator or resources recovery facility must submit a five-year plan to DEP for the recycling or disposal of its ash residue.

Wood-Burning Facilities. Under this act, any demolition debris disposed of at a wood-burning facility shall be limited to debris generated at the state level. DEP shall not issue a permit for any wood-burning facility until January 1, 1990. In conjunction with Council on Environmental Quality (CEQ) and DEP, OPM shall study the advantages and disadvantages of wood-burning facilities in the state.

Solid Waste Lists. Beginning January 1, 1990, DEP shall prepare an annual list of all municipalities without contracts to dispose of solid waste at resource recovery facilities or incinerators. No operator of a resource recovery facility or incinerator may enter into a contract to accept out-of-state waste unless the operator solicits waste from municipalities on this list.

Financing Recycling Facilities. This act establishes a 19-member task force (including DEP) to study methods of encouraging recycling facilities. The task force shall report its recommendation to the environment committee by February 1, 1990.

Transportation Specifications. DOT shall revise the material specifications for DOT projects to encourage the use of recycled materials.

Dioxin Study. DEP, in consultation with DOHS, shall study the measurement and evaluation of dioxin levels in the food chain.

Garbage Broker. Upon request of a locality with no available landfill or contract with a resource recovery facility, DEP shall identify solid waste facilities with the capacity to accept that locality's municipal solid waste. In addition, in consultation with CRRA and local governments, DEP shall study the feasibility of establishing a garbage broker to direct the disposal of solid waste so that solid waste facilities operate at capacity. DEP shall submit this report to the environment committee by February 9, 1990.

P.A. 89-385. An Act Concerning

Reduction of Packaging Material and Disposable Products.

Solid Waste Management Plan. This act requires DEP to revise the solid waste management plan to include a source reduction component. This plan will outline specific strategies to reduce the solid waste generated in this state to maintain the annual per capita solid waste generation rate estimated by the DEP in 1988, including measures to reduce packaging materials and disposable products.

Packaging Regulations. DEP *shall* adopt regulations, not earlier than October 1, 1991, establishing standards and requirements to reduce the volume or weight of disposable packaging material. Regulations adopted under this section *may* establish standards for:

A) labels indicating: (i) whether packaging material is recyclable and the quantity of recycled material in the packaging, if any, and (ii) whether any toxic substance is present in packaging;

B) recycled content in classes of packaging;

C) refillable and reusable packages for certain types of goods;

D) packaging certain products in recyclable packages;

E) prohibit or reduce the use of substances in packaging material to minimize the release of toxic substances from land disposal or incineration;

F) the volume or weight of classes of packaging;

G) the content of toxic substances in printed materials or plastic products disposed of at a resources recovery facility.

Recycling Symbols. DEP shall, by regulation, adopt official symbols that may be placed on packages indicating recyclability or recycled material content, as well as the procedures for the use of such symbols.

Newspapers. This act requires each newspaper published in the state and each newspaper published outside the state (with a daily circulation of 40,000 or more) shall use the following percentage of newsprint with recycled content: for calendar year 1993, 20 percent of newsprint used in 1992; and ascending up to calendar year 1997, with 80 percent of newsprint used in 1996. For any year thereafter, 90 percent of newsprint used in the previous year.

By January 15, 1994, each publisher of a newspaper required to use recycled newsprint shall submit a report to DEP stating the amount of newsprint with recycled content used in the preceding year. DEP shall exempt a publisher from compliance if the publisher certifies that he is unable to obtain sufficient amounts of newsprint at a price comparable with virgin material.

Newsprint Task Force. This act also establishes a newsprint recycling task force to make recommendations for the enhancement and development of newsprint recycling.

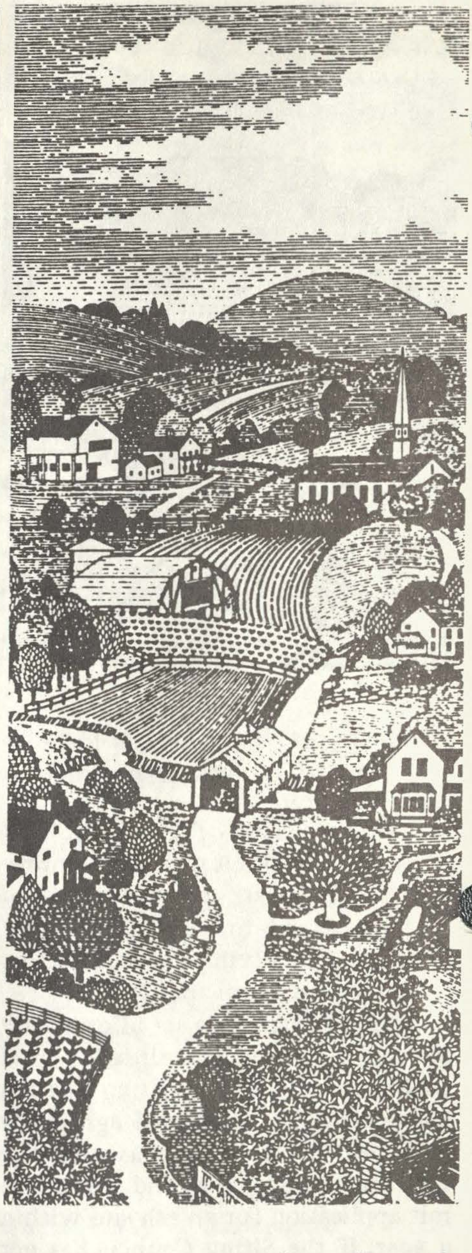
Solid Waste Fee. By July 1, 1990, the owner of any resource recovery facility or mixed municipal waste landfill shall pay to Department of Revenue Services (DORS) the fee of $1 per ton of solid waste processed at the facility or landfill.

State Agencies. Under this act, DAS shall develop and implement a plan to eliminate, by stages, the use of disposable and single-use products in state government. The plan shall be submitted to the environment committee by February 1, 1990. This act also requires each state agency to prepare by October 1, 1990, a plan to reduce the use of disposable and single use products, in accordance with the DAS plan. Finally, this act mandates that DEP shall develop a public education program on waste reduction.

Market Development. Up to $1 million shall be allocated to DEP for public education on waste reduction and for recovered materials market development.

Plastic Bags. After January 1, 1990, each retail establishment which provides plastic bags to its customers shall offer paper bags as an alternative and inform customers that they have a choice. No retail establishment is required to use plastic bags.

Nickel-Cadmium Batteries. By July 1, 1993, no person shall sell any consumer product in this state which contains a nickel-cadium battery unless the battery can be easily removed by the consumer or is contained in a battery pack separate from the product which can be easily removed.



DEP may authorize the sale of a consumer product which does not comply with these provisions for two years if the product was available for sale before October 1, 1989, and the DEP determines that the product cannot reasonably be redesigned by 1993 or that a redesign would threaten public health or job losses.

*

(This summary of the environmental legislation of 1989 will be continued in the next issue of Connecticut Environment.) ■

Eagle Watch

"The Shepaug Bald Eagle Observation Area, operated cooperatively by the Connecticut DEP Wildlife Division and Northeast Utilities, will be open to the public for its fifth winter season on Wednesday, December 27," announced Rita M. Duclos, nonharvested wildlife program biologist for the Wildlife Division.

The Observation Area, in Southbury, will be open three days a week only -- Mondays, Wednesdays, and Saturdays -- from 9:00 a.m. to 1:00 p.m., December 27 through March 14. The area will be closed, however, on New Year's Day, Monday, January 1.

"All individuals and groups wishing to visit the site must make a reservation for a particular date, as there will be a limited number of reservations available per open day," Duclos explained. Entry to the area will be *by reservation only*; individuals and groups arriving at the site without reservations will not be admitted. Starting November 24, reservations may be made Monday through Friday, from 8:30 a.m. to 3:30 p.m., by calling the Special Program Reservations Number: (203) 566-7195. Only *one* reservation may be made per phone call.

Results of an annual review of the area's operation, conducted by division biologists involved with the management of Connecticut's wintering bald eagles, indicate no need for major changes in the operational procedures for the upcoming visitor season. The reservation system implemented several winters ago proved very effective in attaining the area's established goal of providing public education while ensuring the welfare of wintering bald eagles using the area.

"Last year was a spectacular year for viewing eagles at Shepaug. An increase in the Northeast region's eagle population holds great promise for this winter. Given the prospects for larger eagle numbers and the continued cooperation of interested and concerned citizens, the 1990-91 Shepaug visitor season may be the best yet for opportunities to view one of Connecticut's natural wonders," Duclos concluded. ■

Museum Event

The educational program "Fossils and Minerals," with hands-on activities for children, will be featured during Family Day, January 15, from 10 a.m. to 4 p.m. at The Connecticut State Museum of Natural History in the Wilbur Cross Building at The University of Connecticut in Storrs. For further information call 486-4460. ■

Dinomania

"Dinomania -- Dinosaur Fair and Collectibles Show, will take place on Saturday, March 10, 1989, at 10:00 am to 4:00 pm., at Dinosaur State Park in Rocky Hill.

Anything goes. Exhibits of dinosaur collections, including antique toys, games, books, postcards, and movie posters. Plus videos, crafts, door prizes, balloons, lectures, activities, refreshments, and more. Fun for all ages. Rain or shine.

Free with Exhibit Center Admission: $1.00 for adults; $.50 for children 6-17; children five and younger are free.

Dinosaur State Park is located on West Street, Rocky Hill, 06061. For further information, phone (203) 529-8423.

This event is sponsored by Friends of Dinosaur Park Association, Inc. ■

Land Acquisition

Public Act 89-370, involving an amendment to establish a land acquisition fund, was passed by the General Assembly in the last days of the 1989 session. The following is the section of that Public Act specifically related to the acquisition fund.

"Any municipality, by vote of its legislative body, may establish a special fund, which shall be known as the land acquisition fund. There shall be deposited in said fund, annually, an amount not to exceed the amount which would be generated by the imposition of a tax of two mills against the property subject to tax in such municipality pursuant to Chapter 203 of the General Statutes, as may be appropriated by the municipality. Such fund shall be used by the municipality for the acquisition of land to be used for open space, recreation, or housing. Such fund shall not lapse at the close of the muncipial, fiscal year." ■

Advisory Group Formed

Leslie Carothers, commissioner of the DEP, is calling on eight Connecticut colleges and universities to staff a standing committee on the management of Long Island Sound research funds totalling about one million dollars.

In letters to the presidents of the eight schools, Carothers said, "I am forming a standing committee for marine research to provide guidance to our Agency in administering available Long Island Sound research funds provided by the General Assembly. The standing committee will be comprised of staff representatives of eight Connecticut colleges and universities who will serve to advise the DEP on research needs and provide peer review of individual research proposals."

The eight schools contacted were Connecticut College, Fairfield University, Southern Connecticut State University, University of Bridgeport, University of Connecticut, University of New Haven, Wesleyan University, and Yale University. The presidents were asked to designate staff representatives who are involved in scientific or engineering research related to the Sound. The issues to be addressed fall in four major areas: water quality management, fisheries management, coastal area management, and Long Island Sound resource systems.

"The problems of Long Island Sound and planning for their solution," Carothers said, "are among DEP's top priorities. Current, accurate data are essential to the achievement of the Department's goals in this area. The 1989 General Assembly made some one million dollars available to support research related to the management of the Sound. These funds are to be administered through the Clean Water Fund account system. The standing committee for marine research," she explained, "is expected to assist the Department in assuring that the funds are used to address the most significant issues possible in ways that can lead to meaningful improvements in the Sound." ■

Trailside Botanizer

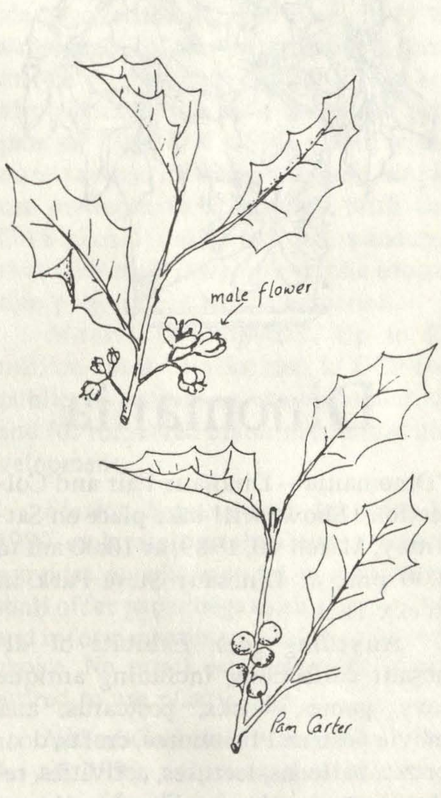
American Holly

by
Gale W. Carter
Illustration by
Pam Carter

Although people usually do not realize it, we have several species of holly growing in the wild in Connecticut. We have both deciduous hollies and an evergreen species -- the American holly (*Ilex opaca*). This is the typical holly that we associate with Christmas. It is our only broad-leaved evergreen; all other evergreens have needles. American holly is also the only one of our native hollies that may grow to tree size -- up to 40 feet in our area.

The shape of the tree is typically pyramidal, with horizontal to drooping branches. It has leaves that are leathery with spiny margins. Their upper surface is dull green, and the underside is yellow.

Flowers of American holly are unisexual, with male flowers on one tree and female on another. Blossoming time is from May to June. The red berry-like fruit appears in August and persists until the following June.



American holly is found only occasionally in Connecticut, usually along the coast in wet sandy areas, as this holly is salt-tolerant. It also grows in moist woodlands.

The species name "opaca" means dull or opaque, a reference to the leaves compared to the shiny leaves of English holly (*Ilex aquifolium*).

Holly was used in Europe at rites to celebrate December 21, the winter solstice. This gradually became incorporated into Christmas celebrations, both in Europe and America, because of the closeness of the date.

The wood of holly is ivory-white, very tough, and can absorb any kind of dye, making it useful as veneer, in cabinet-making, and for black piano keys.

Apart from the fact that it is often used for ornamental purposes, many birds and mammals make use of holly in some way. It is the preferred nesting site for the mockingbird, cardinal, and catbird.

Because native American holly is not a common species in Connecticut, its branches should not be collected for decorations. ■

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The Night Sky

An Astronomical Quirk

by

Francine Jackson

ONE OF ASTRONOMY'S little quirks takes place this month: Based on the observation that more of us are awake at sunset than at sunrise, many of us may assume that Thursday, December 7, will be the shortest day of the year. On that day, we will experience the earliest sunset, at 4:35 p.m. Because of this, the days will appear to lengthen after that, although very slowly, even though they actually are still getting shorter until December 21, the first day of winter, which is the shortest day of the year.

If by chance you are able to stay up all night or awaken before dawn, you will find that the mornings haven't stopped occurring later. Every day, the sun rises later, so that even though it sets a couple of minutes later each afternoon, we are still losing daylight time in the mornings. In actuality, the progression is as follows: earliest sunset -- which occurs on December 7; shortest day -- which occurs on December 21; and latest sunrise -- which won't occur until January 4, when the sun will appear about 7:22 a.m.

All of the above, of course, implies that the earth is the center of attraction in our universe. Although of course we really are aware that the earth moves around the sun, which moves around the galaxy, which moves . . , we always direct the reader to the apparent motion of the sun and the evening sky. We are always playing let's pretend with the sky. Whenever we look up, we see what appears to be motion of all the heavenly bodies when, in fact, we are moving through the universe just as they are. It is only our moving along with the earth that accounts for our apparent stationary feeling. If we could leave the earth and observe it from hundreds of miles up, we would be amazed to see that it rotates at a phenomenal 1,000 miles per hour, and zooms in its path around the sun even faster.

By the way, if any of you are fascinated with astrology, and would like to remind us that as of the winter solstice (December 21) the sun will be in Capricorn, I'm afraid I have bad news: The sun just entered Sagittarius three days earlier. Why? Answer next time. ■

To all our readers -

A Very Merry Christmas

From the staff of
Connecticut Environment

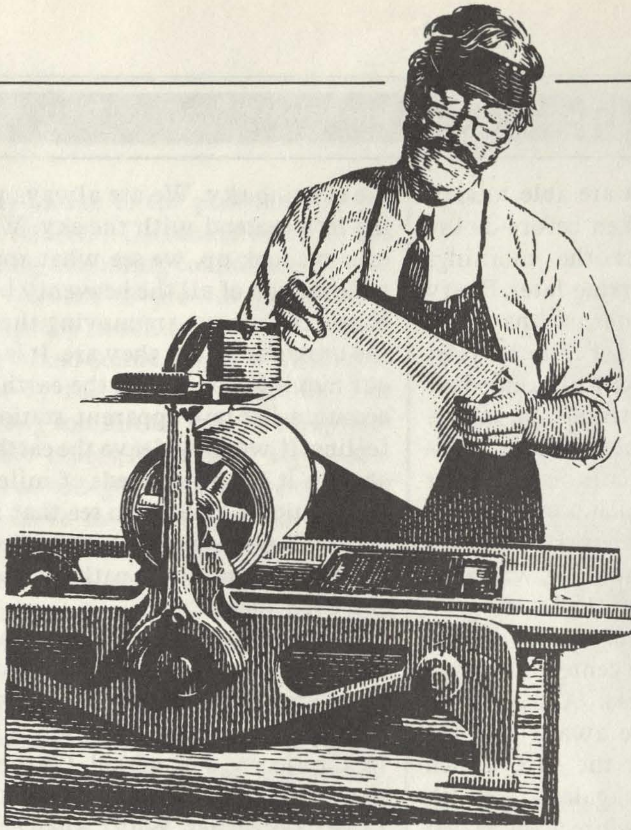
Endnote

"to awaken in a cheap room
in a strange city and
pull up the shade --
this was the craziest kind of
contentment

"and to walk across the floor
to an old dresser with a
cracked mirror --
see myself, ugly,
grinning at it all.

"what matters most is
how well you
walk through the
fire."

Charles Bukowski



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